

Department of Labor and Industries
Ergonomics Rule: Economic Summary

BACKGROUND

Work-related musculoskeletal disorders (WMSDs) are a major contributor to workers' compensation claims, lost workdays and pain and suffering. Musculoskeletal (muscle, bone and connecting tissues) injuries and illness are often referred to as cumulative trauma disorders, repetitive motion disorders, or occupational overuse syndromes. Many employers and employees are unaware of either the risks, or the solutions for WMSDs.

The proposed rule focuses only on risk factors for the largest category of WMSDs, called non-traumatic soft tissue disorders, excluding those injuries from slips, trips, falls, motor vehicle accidents or being struck by or caught in objects, (referred to as WMSDs in the remainder of this document). These disorders are often caused or aggravated by awkward postures; high hand force; highly repetitive motion; repeated impact; heavy, frequent or awkward lifting, and moderate to high vibration. They are often found in jobs characterized by repetitious work or manual materials handling. The State of Washington Industrial Insurance Fund (hereafter referred as the State Fund) pays approximately \$288 million in WMSD claims every year. In addition, a low estimate of the cost of compensable WMSD claims among self-insured employers is approximately \$52 million every year. In other words total direct costs from WMSD generated insurance claims is at least \$340 million per year. The total cost of WMSD injuries to the residents of Washington State is actually much higher than the above figure, as insurance payments from the State Fund and self-insurers do not fully compensate workers for lost time and income. In addition there is evidence that workers make sizable out of pocket payments to treat WMSDs (Morse, et al, 1998). Finally, there are sizable indirect costs associated with WMSDs. The indirect costs, that are the consequence of WMSDs, are borne by the employer in the form of higher absenteeism, turnover and replacement training costs as well as lower overall productivity. Indirect costs are also borne by the employee afflicted with a serious WMSD in the form of reduced long term earning potential and family stability. Indirect cost estimates range from 0.5 to 20 times direct costs, depending on the investigator and the type of injury being studied, with a median value of 4.1 times direct costs (Andreoni, 1986).

Presently, the State of Washington has no specific regulations requiring active identification and control of WMSD risk factors. General regulations requiring an effective accident prevention program and the maintenance of a safe workplace apply to the prevention of WMSD hazards, but they have proven insufficient. An ergonomics rule would provide greater incentives for the identification and control of musculoskeletal hazards in the workplace.

The proposed rule will apply only to employers with jobs having certain risk factors for WMSDs. In the proposed rule these jobs are designated "caution zone jobs." The employer is expected to make a reasonable determination whether this rule applies. Only employers with "caution zone jobs" must comply with Part 2 of the rule. Employers with "caution zone jobs" must provide ergonomics awareness education for workers in those jobs, analyze the "caution zone jobs" for WMSD hazards and reduce exposure to identified hazards. Employers may avoid the job analysis step by directly fixing their "caution zone jobs". The rule is to be phased in over a six-year period, beginning first with employers classified in selected Standard Industrial Classification codes (152, 174, 175, 176, 177, 242, 411, 421, 451, 541, 734 and 805) and having 50 or more employees.

The Regulatory Fairness Act (RFA), Chapter 19.85 RCW, requires that the economic impact of proposed regulations on small businesses must be examined relative to their impact on large businesses. The term small business is defined as a business entity that has the purpose of making a profit and has fifty or fewer employees. If a rule results in a disproportionately large impact on small business the RFA requires that mitigation efforts be undertaken. The department anticipates that the average business compliance cost for the rule will exceed the SBEIS minor cost threshold(s).

The small business economic impact statement does **not** address the current burden of WMSDs, or the anticipated burden under the proposed rule, and is not a cost-benefit analysis. Occupational injury and illness due to WMSDs account for 32% of all State Fund accepted claims and 20 million lost workdays from 1990-1997. Prior research shows that WMSDs addressed by the proposed rule are spread throughout Washington industries. Risk factors for these WMSDs are pervasive across all types and sizes of Washington's industries. The proposed ergonomics rule is designed to reduce WMSD hazards, WMSD claims and the associated direct and indirect costs of WMSDs. The direct cost of WMSDs is over \$340 million per year. The department anticipates that benefits, in the form of a reduction in WMSDs, will significantly exceed the compliance costs presented in this analysis.

METHODS

A survey undertaken by the Safety and Health Assessment & Research for Prevention program (SHARP) of L&I in the summer of 1998 was designed to obtain information on exposures of workers to a set of specific risk factors for WMSD. Firms were asked to report the number of workers exposed to each risk factor for less than 2 hours, 2-4 hours and for more than 4 hours. This source allowed us to estimate the proportion of the workforce in each industry which was exposed to each risk factor for more than two hours (Level 2) and the proportion exposed for more than four hours (Level 3).

To determine the anticipated cost imposed by the ergonomics rule on Washington businesses a telephone survey was developed and administered by L&I in the summer of 1999 (second survey). The survey elicited information from a sample of businesses across many industries. The survey contained questions about WMSD hazards, time and costs incurred to identify jobs with hazards, and implementation of control strategies and training programs. The proportion of firms' already implementing controls and the costs per employee for each element were estimated. To help estimate the costs in each industry to achieve an acceptable degree of hazard reduction, data was obtained from the Occupational Safety and Health Administration (OSHA). The OSHA estimates, made in 1995, constitute the most comprehensive evidence on ergonomic control costs. They are based on an extensive study of industrial scenarios, provided by ergonomists, to represent a wide range of industrial occupations.

In order to obtain the fraction of the workforce exposed to *any or all of the risk factors*, fractions exposed to separate risk factors were combined. The fractions of the workforce exposed to each separate risk factor are likely to overlap, but we assumed uniform distribution of risks throughout the workforce. Therefore, our method *overestimates* the total exposed population and the associated costs which businesses will incur in controlling exposures to WMSD.

For each one-digit SIC and for both small and large businesses, estimates of the total workforce exposure to WMSD risks for 2 or more hours and 4 or more hours were made. These, combined with the per-employee cost data obtained from the second survey and from OSHA, allow us to calculate total cost estimates for each element of the ergonomics rule.

RESULTS AND DISCUSSION

Results were reported at the most detailed level possible given the best available evidence. Costs in each component were annualized and discounted to reflect present value. Results are summarized for each component of the rule as they apply to certain populations.

Rule review costs

The department projects that there will be some costs for the time it takes employers to become familiar with the proposed ergonomics rule and the time required to present the rule to their company's safety committees. These costs are anticipated to be one-time costs and will occur primarily during the rule's phase-in period. Rule review costs are estimated at \$1.87 million for small businesses and \$0.76 million for large businesses. Expressed on a per employee basis the one time cost is \$1.79 for small businesses and \$0.48 for large businesses.

Job Identification and Job Analysis

The department anticipates that most employers will perform a quick and inexpensive step to determine whether or not they are covered by the rule. This identification time is estimated at 5 minutes per job where WMSD hazards may exist. Identification costs are estimated at \$0.39 per employee for small employers and \$0.22 for large employers per year. For those employers having "caution zone jobs" (Level 2), employers are expected to conduct a more detailed job analysis. It is estimated that because the ergonomic solutions for many jobs are straightforward, employers will decide to fix 30% of the caution zone without the need for job analysis. Total costs of job analysis were determined by applying the applicable population times the total estimated assessment time and wages for job hazard analysis. Annual costs per employee averaged \$0.88 for small businesses and \$1.16 for large businesses.

Engineering and Administrative Controls

For jobs identified as WMSD hazard (Level 3) jobs employers will be required to take control steps to reduce the exposure. Typically engineering or administrative controls steps will be necessary to reduce the hazard. The OSHA estimated control costs, expressed on a per employee basis (1999 dollars), were multiplied by the number of jobs with WMSD hazards. Annual engineering and administrative control costs per employee averaged \$18.46 for small businesses and \$20.65 for large businesses.

Personal Protective Equipment Costs

A fall back approach for controlling workplace ergonomics hazards is to use Personal Protective Equipment (PPE). Estimated PPE costs were multiplied times the number of jobs with WMSD hazards. The annual PPE cost per employee averaged \$0.16 for small businesses and \$0.24 for all large businesses.

Basic Awareness Education

Employers with “caution zone jobs” must provide basic ergonomics awareness education. Estimates of educational awareness cost were aggregates of cost for employee and cost of supervisor and trainer time. Basic ergonomics awareness education costs per employee were estimated to be \$1.87 for all small businesses and \$1.73 for all large businesses.

Hazardous Job Training

Employees working in jobs with WMSD hazards will be required to be trained on job-based ergonomic hazards. Estimates of specific training cost were aggregates of cost for employee training time and instructor time. Annual per employee hazard job training costs were estimated to be \$1.86 for all small businesses and \$1.24 for all large businesses.

Training the Trainer

For those conducting job analysis and hazardous job training sessions, some level of advanced training will be necessary. These costs were composed of personnel time and a class cost. Annuals per employee training costs were estimated to be \$3.00 for all small businesses and \$0.97 for all large businesses.

Managerial and administrative costs

No record keeping is required under the rule. However, employers must be able to demonstrate various elements of compliance. Associated costs were estimated from responses to the 1999 L&I survey described above, regarding personnel managing ergonomics programs and percent of time spent on ergonomics. Small employer managers spent roughly half the time of large employers on ergonomic related issues. Annual per employee managerial and administrative costs were \$3.06 for small businesses and \$1.37 for large.

Total Estimated Annual Costs, Per Employee Costs and Costs as a Percent of Sales

Total costs for the proposed rule, and costs per employee were estimated by combining the nine cost sub-components presented above. Results are presented in Summary Table 1. Total annual compliance costs for small, large and all businesses are estimated at \$32.9 million, \$44.2 million and \$77.1 million dollars respectively. On a per employee basis the average annual costs are \$31.47 for small businesses and \$28.03 for large businesses and \$29.40 for all businesses. Total costs and costs as a percent of sales by industrial category are provided in Summary Table 2. The results show that compliance costs are no more than 0.14 percent of sales for any single industrial category (small business in SIC1). Additional cost information is available in the full SBEIS.

Summary Table 1. Annual cost of the proposed ergonomics rule in each component category

Ergonomics Rule Cost Module	Small business		Large business		All businesses	
	Total cost	Cost per emp.	Total cost	Cost per emp.	Total cost	Cost per emp.
Rule Review	\$1,873,229	\$1.79	\$756,094	\$0.48	\$2,629,323	\$1.00
Job ID	\$406,834	\$0.39	\$343,828	\$0.22	\$750,662	\$0.29
Job analysis	\$919,534	\$0.88	\$1,828,192	\$1.16	\$2,747,726	\$1.05
Eng/Admin. Control	\$19,318,843	\$18.46	\$32,529,031	\$20.65	\$51,847,874	\$19.78
PPE	\$169,046	\$0.16	\$376,583	\$0.24	\$545,628	\$0.21
Awareness educate	\$1,959,468	\$1.87	\$2,730,970	\$1.73	\$4,690,437	\$1.79
Haz. Job training	\$1,944,774	\$1.86	\$1,951,656	\$1.24	\$3,896,430	\$1.49
Training the trainer	\$3,143,009	\$3.00	\$1,479,113	\$0.94	\$4,622,122	\$1.76
Mang. Cost	\$3,197,527	\$3.06	\$2,158,640	\$1.37	\$5,356,167	\$2.04
Total Estimated Cost	\$32,932,263	\$31.47	\$44,154,107	\$28.03	\$77,086,370	\$29.40

Summary Table 2. Annual costs and percent of sales by industrial category

SIC	Industry	Small Business		Large Business		All Businesses	
		Total cost	% of sales	Total cost	% of sales	Total cost	% of sales
0	AGRICULTURE AND FORESTRY	\$3,782,287	0.141%	\$898,782	0.065%	\$4,681,069	0.115%
1	MINING AND CONSTRUCTION	\$10,893,303	0.098%	\$5,605,718	0.045%	\$16,499,021	0.070%
2	MANUFACTURING: NON-DURABLE	\$1,000,314	0.031%	\$3,761,103	0.011%	\$4,761,416	0.013%
3	MANUFACTURING: DURABLE	\$1,013,068	0.029%	\$9,207,667	0.017%	\$10,220,735	0.017%
4	TRANSPORTATION & PUBLIC UTIL.	\$1,805,716	0.073%	\$5,957,881	0.056%	\$7,763,597	0.059%
5	WHOLESALE TRADE	\$6,921,102	0.025%	\$8,167,210	0.009%	\$15,088,312	0.012%
6	RETAIL TRADE	\$1,265,154	0.029%	\$1,353,776	0.008%	\$2,618,929	0.013%
7	GENERAL SERVICES	\$2,143,929	0.027%	\$3,398,294	0.021%	\$5,542,223	0.023%
8	PROFESSIONAL SERVICES	\$3,919,762	0.038%	\$5,696,970	0.035%	\$9,616,732	0.036%
9	PUBLIC ADMINISTRATION	\$187,629	*	\$106,707	*	\$294,336	*
SUM		\$32,932,263	0.0447%	\$44,154,107	0.0170%	\$77,086,370	0.0232%

* Gross business sales not available for SIC 9

CONCLUSION

The proposed ergonomics rule requires employers with “caution zone jobs” to ensure educational awareness programs on ergonomic risks, signs and symptoms of WMSDs and on elements of the ergonomics rule. Employers with hazardous jobs are expected to eliminate or reduce hazards for employees who are exposed.

Using a combination of information from the SHARP, L&I employer surveys, OSHA and various labor market sources, the Department of Labor and Industries concludes that the ergonomics rule will not have a disproportionate impact to small employers. The department has found that the per employee compliance costs are approximately 10% higher for small employers relative to large employers and does not consider differences large enough to be indicative of disproportionate impact. Identification and analysis, training and awareness all pose relatively small costs. The largest cost component is due to ergonomic controls that *only* employers with WMSD hazard jobs would be expected to sustain.

The methods used in this analysis did not take into account any of the potential benefits of the proposed ergonomics rule. Each WMSD claim costs the State Fund an average of \$5,462. Each case represents higher premium costs for employers, additional non-insurance costs, and as well as pain and suffering borne by those with WMSD injuries. Many cases will be prevented through the proper application of ergonomics awareness education and controls. A subsequent cost-benefit analysis will estimate compliance cost of the proposed rule relative to expected benefits.

Despite little evidence that the ergonomics rule will have a disproportionate impact on small employers, the department recognizes that small businesses face inherent disadvantages which might not be fully demonstrated in this analysis. Therefore, the department concludes that a prudent approach to the rule is to make special allowances for potential impacts on small business. Mitigation of costs is planned in three ways. First, as discussed in this report, there will be a phase-in period, which includes delayed enforcement for small businesses. The department intends to undertake substantial efforts to provide assistance for small businesses in preparing for the rule during this phase-in. Second, under the rule employers will have the option of following specific compliance criteria laid out by the department for identifying and reducing WMSD hazards, or developing and using their own compliance criteria which is tailored to the employers’ work-site and needs. Third, the department’s method of assessing penalties for violations of rules allows a very substantial penalty reduction for small employers.